THE 1975 BELL SYSTEM TECHNICAL JOURNAL

ADVISORY BOARD

D. E. PROCKNOW, President,
Western Electric Company, Incorporated

W. O. BAKER, President,
Bell Telephone Laboratories, Incorporated

W. L. LINDHOLM, Vice Chairman of the Board,
American Telephone and Telegraph Company

EDITORIAL COMMITTEE

W. E. DANIELSON, Chairman

F. T. ANDREWS, JR.

J. M. NEMECEK

S. J. BUCHSBAUM

C. B. SHARP

I. DORROS

B. E. STRASSER

D. GILLETTE

D. G. THOMAS

W. ULRICH

EDITORIAL STAFF

L. A. HOWARD, JR., Editor

P. WHEELER. Associate Editor

J. B. FRY, Art and Production Editor

F. J. SCHWETJE. Circulation

Index and Contents

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
NEW YORK

LISTS OF ISSUES IN VOLUME 54

No. 1, January	1-208
No. 2, February	209-470
No. 3, March	471 - 666
No. 4, April	667 - 810
No. 5, May-June	811-970
No. 6, July-August	971-1178
No. 7, September	1179-1354
No. 8, October	1355-1506
No. 9, November	1507-1664
No. 10, December	1665-1796
SAFEGUARD Special Supplement	S1-S270
Index	iii
Contents.	xvii

 $\operatorname{NOTE} : \operatorname{Words}$ in parentheses precede words not in parentheses in the same entry. For example:

Alarms (Digital Data System)

should be read Digital Data System Alarms

Index to Volume 54

Α

ABM See Antiballistic Missile System ACOUSTIC MODEL OF VOCAL CORDS AND VOCAL TRACT 485-506

ACTIVE FILTERS

(RC, D3 Channel Bank) 507-29 (Shifted-Companion-Form, Design and

Evaluation) 545-68 Adaptive and Nonadaptive, Frame-to-FRAME, LINEAR-PREDICTIVE CODING OF VIDEOTELEPHONE SIGNALS (ENTROPY MEASUREMENTS) 1155-74

ADAPTIVE DELTA MODULATION (SINGLE-

INTEGRATION) 1463-74

ADAPTIVE EQUALIZERS WITH PARTIAL-RESPONSE SIGNALING (NEW, FAST-Converging Mean-Square Algo-rithm) 143-53

ADAPTIVE QUANTIZER (NEW RESULTS FROM A MATHEMATICAL STUDY) 335-

ADAPTIVE TRANSVERSAL-FILTER EQUAL-IZERS (FAST START-UP) 369-406

Administrative Responsibilities (Digi-TAL DATA SYSTEM) 845-60

Ahamed, S. V. 317-34

ALARMS (DIGITAL DATA SYSTEM) 845-60 ALGORITHM (NEW, FAST-CONVERGING MEAN-SQUARE FOR ADAPTIVE EQUAL-IZERS WITH PARTIAL-RESPONSE SIG-NALING) 143-53

Algorithm for Determining the Endpoints of Isolated Utterances (An) 297-315

ALGORITHMIC DESIGN OF DIGITAL FILTERS 767-81

All-Glass Optical-Fiber Tapes 479-84 ALL-PASS DIGITAL FILTERS DESIGN 767-

Aluminum Oxide/Silicon Dioxide Double-Insulator, MOS Structure 687-719

AMPLIFIER DESIGN (WIDEBAND, USING MAJOR MULTILOOP FEEDBACK TECH-NIQUES) 1253-75

Analysis and Optimal Design of a Multiserver, Multiqueue System With Finite Waiting Space in Each Queue 595-

Analysis of Field-Aided, Charge-Coupled Device Transfer 667-85

Analysis of Specially Doped Varactors for Direct Frequency Tripling 317-34

Analysis of the Effect of Lossy Coatings on the Transmission Energy in a Multimode Optical Fiber (An) 1531-46

Analysis of Trunk Groups Containing Short-Holding-Time Trunks 1127-53 Anderson, I. 783-95, 1725-31

ANISOTROPIC OPTICAL WAVEGUIDES (COU-PLED-MODE THEORY) 985-95

ANTENNA SATELLITE (MULTIBEAM, SPHER-ICAL-REFLECTOR, FOR 20- AND 30-GHz BANDS) 1011-26

Antiballistic Missile System (SAFE-GUARD) S1-261

Applications of Group Theory to Connecting Networks 407-20

Approximate Method for Calculating Delays for a Family of Cyclic-Type Queues

(An) 1733-54 Aprille, T. J., Jr. 1253-75

ARCHITECTURE OF THE CENTRAL LOGIC AND CONTROL (SAFEGUARD DATA-Processing System) S41-61

Arnaud, J. A. 263-83, 1179-205, 1431-50 Autocorrelation Criterion for the Time-Diversity Reception of Speech Over Burst-Error Channels (An) 1583-95

AUTOMATIC CALL DISTRIBUTORS (MULTI-SERVER, MULTIQUEUE SYSTEM) 595-623

BASEBAND, BIPOLAR TRANSMISSION (DIGI-TAL DATA SYSTEM) 919-42

BEAM WAVEGUIDE SYSTEMS WITH IMPER-FECT LENSES (LOSS CALCULATIONS) 783 - 95

Bell Laboratories Fiftieth Anniversary (Edi-

torial) 1-2
Bender, E. C. 919-42
Benes, V. E. 407-20, 421-34, 797-805
Bennett, J. E. 997-1009
Benowitz, P. 893-918

Benowitz, P. 893-918 Berglund, C. N. 687-719 BIGFET See BIPOLAR-IGFET

BIGFET SIC See BIPOLAR-IGFET SILI-CON-INTEGRATED CIRCUITS

BINARY DATA TRANSMISSION AT RATES FASTER THAN NYQUIST RATE 1451-62

BIPOLAR-IGFET, DEPLETION-LOAD, p-CHANNEL TECHNOLOGY 69-79 BIPOLAR-IGFET SILICON-INTEGRATED CIRCUITS 69-79

Bisbee, D. L. 471-7, 479-84, 971-84 BIT-STREAM MULTIPLEXING (DIG (DIGITAL DATA SYSTEM) 861-78

BIT-STREAM ROUTING ON LONG-HAUL FACILITIES (DIGITAL DATA SYSTEM) 861-78

BLOCKING (NONSTATIONARY IN TELE-PHONE TRAFFIC) 625-61

Brophy, F. J. 767–81 Brown, N. H. S9–25 Brown, P. F., Jr. 861-78 Bullington, K. 177-87

BURST-ERROR CHANNELS (AUTOCORRELA-TION CRITERION FOR TIME-DIVERSITY SPEECH RECEPTION) 1583 - 95

Butterfield, S. J. 893-918

Cable Connector (Fiber-Optic) 1547-55

Cables and Tapes (Optical-Fiber, Molded-Plastic Technique for Connecting and Splicing) 971-84

CALCULATING DELAYS FOR CYCLIC-TYPE QUEUES (APPROXIMATE METHOD) 1733-54

CALCULATING RAIN ATTENUATION DIS-TRIBUTIONS ON MICROWAVE PATHS 1051-86

Carbon Transmitter Model (T1, Used in Computer-Aided Analysis of Telephone Set Transmission Characteristics) 1301-18

Cascaded Scramblers 569-93 CCD See Charge-Coupled Device Central Logic and Control (Design, SAFEGUARD Data-Process-

ing System) S41-61

(Operating System, SAFEGUARD Data-Processing System) S89-99
CENTRAL OFFICE EQUIPMENT FRAMES

(DIGITAL DATA SYSTEM) 943-64 CENTRAN—A CASE HISTORY IN EX-TENDIBLE LANGUAGE DESIGN (SAFE-

GUARD DATA-PROCESSING SYSTEM) S161-72 CHANNEL ERRORS (EFFECTS ON SIGNAL-

To-Noise Performance of Speech-Encoding Systems) 1615–36

CHANNEL SERVICE UNIT (DIGITAL DATA SYSTEM) 919-42

CHARGE-COUPLED DEVICE TRANSFER
(ANALYSIS OF FIELD-AIDED) 667-85
CHARGE TRANSPORT IN A CHARGE-COU-

PLED DEVICE 667-85 Cherin, A. H. 17-45, 1531-46 Chinnock, E. L. 471-7, 971-84 Chu, T. S. 1665-80

Chung, F. R. K. 1647-61 Cichetti, M. P., Jr. 893-918 Clemens, J. T. 687-719

CLOCK DISTRIBUTION (DIGITAL DATA SYSTEM) 879-92

CLOS' NETWORK (TOWARD A GROUP-THEO-RETIC PROOF OF THE REARRANGE-ABILITY THEOREM FOR) 797-805

Coder (Low-Bit-Rate Interframe for Videotelephone) 1475-95 Coders (Step-Size Transmitting Dif-

FERENTIAL FOR MOBILE TELEPHONY)
1557-81
Coding Television Pictures for Digi-

Coding Television Pictures for Digital Channel Transmission 1155– 74

COMMON-CARRIER BAND (IMPATT AM-PLIFIER FOR SHORT-HAUL RADIO RE-LAY APPLICATIONS) 721-33

Communication Systems (Digital Fiber-Optic, Optimum Direct Detection) 1389-430 Comparative Study of Various Quantization Schemes for Speech Encoding (A) 1597-614

COMPUTER-AIDED ANALYSIS OF TELEPHONE SET TRANSMISSION CHARACTERISTICS (USING T1 CARBON TRANSMITTER MODEL) 1301-18

COMPUTER RESOURCE UTILIZATION (EF-FECTIVE, SAFEGUARD DATA-PROC-ESSING SYSTEM) S191-6

COMPUTER STUDY OF CROSSTALK FOR-MULAS 17-45

COMPUTERS AND SOFTWARE (SUPPORT, SAFEGUARD DATA-PROCESSING SYSTEM) S149-60

Confocal Apertures (Effect of Small Phase Errors Upon Transmission Between) 783-95

Connect-Disconnect Splice for Single Fibers 1215–25

Connecting and Splicing Optical-Fiber Tapes and Cables (Molded-Plastic Technique) 971–84

Connecting Networks
(Applications of Group Theory) 407–
20

(Proving Rearrangeability by Group Calculations) 421-34

CONNECTOR (FIBER-OPTIC-CABLE) 1547-55

Conners, R. R. S149-60
Converging Equalization Technique for Synchronous Data Communication (Cyclic Equalization) 369-406

Core Distortions (Mode Coupling in an Optical Fiber with) 3-15 Cost-Plus-Award-Fee Contract for a Large Software Development Pro-

LARGE SOFTWARE DEVELOPMENT FRO-GRAM (SAFEGUARD DATA-PROC-ESSING SYSTEM) S237-44 Coupled-Mode Theory for Anisotropic Opti-

cal Waveguides 985-95
Coupled-Power Equations (Two Derivations of Time-Dependent) 47-

Coupling (Transverse, Fiber Optics— Crosstalk) 1431–50

Cox, D. C. 435–50 Crochiere, R. E. 1497–502 Cross, T. G. 893–918

Cross-Polarization Coupling (Rain-Produced Depolarization) 435–50 Crosstalk

Between Multimode Optical Fibers (Quasi-Ray Analysis) 17–45 (Effect of Longitudinal Imbalance)

1227-51 In Multichannel Communication Systems 1431-50

(Transverse Coupling in Fiber Optics) 1431–50

Crowley, T. H. S3-5 Cummiskey, P. 1463-74 CUSTOMER SERVICE (DIGITAL DATA SYS-TEM) 845-60

Cyclic Equalization—A New Rapidly Converging Equalization Technique for Data Communication Synchronous

CYCLIC-TYPE QUEUES (APPROXIMATE METHOD FOR CALCULATING DELAYS) 1733 - 54

D

Dabby, F. W. 451-5 Daniels, R. W. 507-29 Danielson, W. E. 1-2

DATA COMMUNICATION (Synchronous, CYCLIC EQUALIZATION) 369-406

DATA COMMUNICATIONS

Network (Digital Data System) 811-

Performance Objectives (Digital Data System) 833-44

DATA-PROCESSING SYSTEM (SAFE-GUARD) S1-261

Performance Requirements in Retrospect (SAFEGÜARD) S29-37 DATA REDUCTION SYSTEM (SAFEGUARD

Data-Processing System) S181-9 DATA SERVICE UNIT (DIGITAL DATA System) 919-42

DATA TRANSMISSION (TIMING RECOVERY AND SCRAMBLERS) 569-93

Dataphone® DIGITAL SERVICES 811-32 Davis, E. J. S223-9

DDS See DIGITAL DATA SYSTEM DEBUGGING A REAL-TIME MULTIPROCES-SOR SYSTEM (SAFEGUARD DATA-

Processing System) S133-45 DeLange, O. E. 165-76

DELAYS FOR CYCLIC-TYPE QUEUES (AP-PROXIMATE METHOD FOR CALCULAT-ING) 1733-54

DELTA MODULATION (ADAPTIVE, SINGLE-INTEGRATION) 1463-74

Delta Modulation Coders 1557-81 Depletion IGFET Fabrication 69-79 Depletion-Load, p-Channel, Bipolar-IGFET Technology (A) 69-79

DEPOLARIZATION (RAIN-PRODUCED, EF-FECTS OF MEASUREMENT ERRORS) 435-50

Descloux, A. 1277-300 Design and Evaluation of Shifted-Compan-

ion-Form Active Filters 545-68 DESIGN OF MULTISERVER, MULTIQUEUE SYSTEM WITH FINITE WAITING SPACE IN EACH QUEUE 595-623

DESIGN TECHNIQUES FOR DIGITAL PHASE Networks (Two) 767-81

DETECTION (OPTIMUM DIRECT, DIGITAL FIBER-OPTIC COMMUNICATION SYSтемя) 1389-430

DETECTION WITH UNBOUNDED INTERSYM-BOL INTERFERENCE (UPPER BOUND

ON ERROR PROBABILITY) 1341-51 DEVELOPMENT TOOLS AND TECHNIQUES DATA-PROCESSING (SAFEGUARD SYSTEM) S199-219

DIAL-TONE DELAY IN NO. 5 CROSSBAR 1733 - 54

(Effect of Frame Load and Balance) 1755 - 93

Dickman, B. N. S161-72

DICTIONARY APPROACH TO DIGITAL MAIN-TENANCE (SAFEGUARD DATA-PROC-ESSING SYSTEM) S73-85

DIELECTRIC WAVEGUIDES (ANISOTROPIC, COUPLED-MODE THEORY) 985-95

DIELECTRICS (POLARIZATION-INDEPEN-DENT, MULTILAYER AT OBLIQUE IN-

Dietrich, A. F. 165-76

DIFFERENTIAL CODERS (STEP-SIZE TRANS-MITTING FOR MOBILE TELEPHONY) 1557 - 81

DIFFERENTIAL PULSE CODE MODULATION See DPCM

Diffusion Model Approximation for the GI/G/1 Queue in Heavy Traffic (A) 1637 - 46

DIGIT-RECOGNITION SYSTEM (SPEAKER-INDEPENDENT) 81-102

DIGITAL DATA DECODING IN PRESENCE OF INTERSYMBOL INTERFERENCE 1087-94

Digital Data System: Digital Multiplexers 893-918 Local Distribution System 919-42 Network Planning 861-78

Network Synchronization 879-92 Physical Design 943-64 System Overview 811-32 Testing and Maintenance 845-60 User's View of the Network 833-44

DIGITAL DATA TRANSMISSION (WIRE-TAP AT RECEIVER) 1355-87 DIGITAL FIBER-OPTIC COMMUNICATION

Systems (OPTIMUM DIRECT DETEC-TION) 1389-430 DIGITAL FILTER BANKS FOR SPEECH ANAL-

YSIS (FIR) 531-44 FILTERS DESIGN (ALL-PASS) DIGITAL 767 - 81

DIGITAL, FREQUENCY-MODULATION SIGNAL (POWER SPECTRUM) 1095-125 DIGITAL MAINTENANCE (DICTIONARY AP-

PROACH, SAFEGUARD DATA-PROC-ESSING SYSTEM) S73-85

DIGITAL MULTIPLEXERS (DIGITAL DATA SYSTEM) 893-918

DIGITAL PHASE NETWORKS (Two Design Techniques) 767-81

DIGITAL PHASE SHIFTER DESIGN 1497-502

DIGITAL PHASE SHIFTERS (NOVEL IMPLE-MENTATION) 1497-502

DIGITAL SERVING AREA DISTRIBUTION (DIGITAL DATA SYSTEM) 861-78

DIGITAL SPEECH ENCODING 1597-614, 1615-36

DIGITAL SPEECH TRANSMISSION 1557-81, 1583 - 95

DIGITAL TRANSMISSION SYSTEMS 811-32 DIPLEXER (MICROWAVE QUASI-OPTICAL POLARIZATION) 1665-80

DIPLEXERS (RESONANT-GRID QUASI-OPTI-CAL) 263-83

DIPLEXING OF MICROWAVES 1665-80 DIRECT DETECTION (OPTIMUM, FOR DIGI-TAL FIBER-OPTIC COMMUNICATION Systems) 1389-430

DIRECT FREQUENCY TRIPLING (SPECIALLY DOPED VARACTORS FOR) 317-34 DIRECTORY ASSISTANCE SYSTEMS (QUEU-

ING MODEL) 595-623
DISTRIBUTION NETWORK DESIGN (DIGI-TAL DATA SYSTEM) 861-78 DM See Delta Modulation

Domestic Satellite Service (Multi-BEAM ANTENNA) 1011-26

Donohue, B. P., III S111-22 DOPED VARACTORS (DIRECT FREQUENCY TRIPLING) 317-34

Double-Insulator MOS STRUCTURE (Aluminum Oxide/Silicon Dioxide) 687 - 719

Dow, R. J. 507-29 Doyle, W. S. S101-9 DPCM CODERS 1557-81 DPCM Speech Transmission 1693-723 DPCM Transmissions 1583-95 D3 Channel Bank (RC Active Filters) 507 - 29

Duffy, F. P. 209-43 DYNAMIC MODEL OF VOCAL CORDS AND VOCAL TRACT (SPEECH SYNTHESIS) 485-506

ECHO PATH CHARACTERISTICS 209-43 Echo Performance of Toll Telephone Connections in the United States 209-43

Echo Suppressors (Toll Telephone Connections) 209-43

Effect of Frame Load and Balance on Dial-Tone Delay in No. 5 Crossbar (The) 1755 - 93

Effect of Junction Capacitance on the Rise Time of LEDs and on the Turn-on Delay of Injection Lasers 53-68

Effect of Longitudinal Imbalance on Crosstalk (The) 1227-51

Effect of Small Phase Errors Upon Transmission Between Confocal Apertures (The) 783-95

EFFECTIVE COMPUTER RESOURCE UTILIZA-TION (SAFEGUARD DATA-PROCESS-ING SYSTEM) S191-6

Effects of Channel Errors on the Signal-to-Noise Performance of Speech-Encoding Systems 1615-36

Effects of Environmental Nuclear Radiation on Optical Fibers 1207-13

Effects of Measurement Errors on Rain Depolarization Experiments (Some) 435 - 50

Efficient Linear Prediction Vocoder (An) 1693-723

ELECTROMAGNETIC FIELD PROBLEM SOLU-TION (Anisotropic DIELECTRIC Waveguides) 985-95

ENCODER-DECODER DESIGN (WIRE-TAP AT RECEIVER) 1355-87 ENCODING DATA TRANSMISSION TO EN-

SURE A HIGH CONFUSION LEVEL AT Wire-Tapped Receiver 1355-87

ENDPOINT LOCATION Algorithm 297–315 of Speech 297–315 Problem 297–315

ENDS (OPTICAL-FIBER, PREPARATION FOR Low-Loss Tape Splices) 471-7

Entropy Measurements for Nonadaptive and Adaptive, Frame-to-Frame, Linear-Predictive Coding of Videotelephone Signals 1155-74

NUCLEAR RADIATION ENVIRONMENTAL (EFFECTS ON OPTICAL FIBERS) 1207-

EQUALIZATION (NEW RAPIDLY CONVERG-DATA COMMUNICATION) 369-40 Phase 189-201 ING TECHNIQUE FOR SYNCHRONOUS 369-406

EQUALIZER TIMING PHASE EQUALIZERS

(Adaptive Transversal-Filter, Fast 369-406 Start-Up)

(Adaptive with Partial-Response Signaling, Mean-Square Algorithm) 53

ERROR CONTROL (SAFEGUARD DATA-PROCESSING SYSTEM) S123-31 ERROR PROBABILITY FOR DETECTION WITH

Unbounded Intersymbol Interfer-ENCE (UPPER BOUND) 1341-51 SHIFTED-COMPANION-EVALUATION OF

FORM ACTIVE FILTERS 545-68 Excitation of Parabolic-Index Fibers With Incoherent Sources 1507-30

Experiment on Propagation of 60-GHz Waves Through Rain (An) 165-76
EXTENDIAL LANGUAGE DESIGN (CEN-

SAFEGUARD Data-Proc-ESSING SYSTEM) S161-72

Fabisch, M. P. S9-25 FADING 103-42

FAR-FIELD RADIATION PATTERNS FOR AN Offset Launcher 1319-40 Faster-Than-Nyquist Signaling 1451-62

FAULT ISOLATION AND REPAIR (DIGITAL DATA SYSTEM) 845-60

DATA SYSTEM) 845-60
Fe/Co/V ALLOY (REMENDUR) (INFLUENCES OF GLASS-TO-METAL SEALING ON STRUCTURE AND MAGNETIC PROPERTIES) 997-1009

FEEDBACK TECHNIQUES (WIDEBAND AM-PLIFIER DESIGN USING MAJOR MULTI-

LOOP) 1253-75

(Multimode Optical, Effect of Lossy Coatings on Transmission Energy) 1531-46

(Optical, Preparation for Low-Loss Tape Splices) 471-7 (Optical, with Core Distortions, Mode

Coupling) 3–15

FIBER DISTORTION AND LOSS 245-62 FIBER JACKET DESIGN 245-62

Fiber-Optic-Cable Connector (A) 1547-55 FIBER-OPTIC COMMUNICATION SYSTEMS (DIGITAL, OPPIMUM DIRECT DETEC-TION) 1389-430

FIBER OPTICS (TRANSVERSE COUPLING— CROSSTALK) 1431-50

FIBER STRAIGHTNESS AND LOSS (INFLU-ENCE OF OPTICAL FIBER PACKAGING) 245-62

FIBER TAPES (OPTICAL, ALL-GLASS) 479-84

FIBER TAPES AND CABLES (OPTICAL, MOLDED-PLASTIC TECHNIQUE FOR CONNECTING AND SPLICING) 971-84 FIBERS

(Fused-Silica, Permanent Multiple Splices) 451-5

(Multimode Optical, Pulse Broadening) 1179-205

(Multimode Optical, Quasi-Ray Analysis of Crosstalk) 17-45 (Optical, Effects of Environmental Nu-

clear Radiation) 1207-13 (Optical, Germanium-Doped; Material

Structure) 1681–92-(Optical, Loose Tube Splices) 1215–25 (Optical, Microbending Loss) 457–65 (Parabolic-Index with Incoherent

Sources, Excitation) 1507-30 FIELD-AIDED, CHARGE-COUPLED DEVICE TRANSFER (ANALYSIS) 667-85 FILTER BANKS (FTR DIGITAL, FOR SPEECH

Analysis) 531-44 Filters

(Active, Shifted-Companion-Form, Design and Evaluation) 545-68 (RC Active, D3 Channel Bank) 507-

FINITE IMPULSE RESPONSE See FIR FINITE WAITING SPACE IN QUEUE (MULTI-SERVER, MULTIQUEUE SYSTEM ANAL-YSIS AND OPTIMAL DESIGN) 595–623 FIR Digital Filter Banks for Speech Analysic 521–44

sis 531-44 Fitch, S. M. 845-60 Flanagan, J. L. 485-506 FLATBAND THEORY FOR

FLATBAND THEORY FOR DIELECTRIC STRUCTURES 687-719 FLF ACTIVE FILTER DESIGN 545-68

FM RADIO RELAY APPLICATIONS (SHORT-HAUL, IMPATT AMPLIFIER) 721-33

FOLLOW-THE-LEADER, FEEDBACK-TYPE See FLF

FOREWORD (SAFEGUARD DATA-PROC-ESSING SYSTEM) S3-5

Forney's Upper Bound (Geometric Derivation) 1087–94 (Validity for Unbounded Intersymbol Interference) 1341–51

Forys, L. J. 1127–53 Foschini, G. J. 1389–430

Frame Load and Balance (Effect on Dial-Tone Delay in No. 5 Crossbar) 1755-93

FRAME-TO-FRAME CODER (LOW-BIT-RATE FOR VIDEOTELEPHONE SIGNALS) 1475-95

Frame-to-Frame, Linear-Predictive Coding of Videorelephone Signals (Nonadaptive and Adaptive, Entropy Measurements) 1155-74

Freeman, R. D. S199–210 Frequency-Dependent Power Gain (Multiloop Feedback) 1253-75

Frequency Diversity 103-42 Frequency-Modulation Signal (Digital, Power Spectrum) 1095-125

Frequency Tripling (Direct, Specially Doped Varactors for) 317–34 Friedenson, R. A. 507–29

Fused-Silica Fibers (Permanent Multiple Splices) 451-5

G

Gamma Rays (Effects on Optical Fibers) 1207-13

Gans, M. J. 1319-40, 1665-80 Gardner, W. B. 457-65 Gawron, L. J. S123-31

Geometric Derivation of Forney's Upper Bound (A) 1087-94

GERMANIUM-DOPED OPTICAL FIBERS AND PREFORMS (MATERIAL STRUCTURE) 1681-92

Gewartowski, J. W. 721-33 GI/G/1 QUEUE IN HEAVY TRAFFIC (DIF-FUSION MODEL APPROXIMATION) 1637-46

Gibbons, J. R. S101-9
Gilbert, E. N. 735-65
Gitlin, R. D. 569-93, 1389-430
GLASS OPTICAL-FIBER TAPES 479-84
GLASS-TO-METAL SEALING (INFLUENCES
ON STRUCTURE AND MAGNETIC PROP-ERTIES OF AM FE/Co/V ALLOY) 997-

1009 Gloge, D. 245-62, 471-7, 971-84 GLOSSARY (SAFEGUARD DATA-PROC-ESSING SYSTEM) S261

GLOSSARY OF ACRONYMS AND ABBREVIA-TIONS (DIGITAL DATA SYSTEM) 811-

GRAPHICAL INFORMATION (TRANSMISSION BY VIDEOTELEPHONE) 1475-95

(Theory of Self-Resonant) 1725 - 31

GROUP CALCULATIONS (PROVING REAR-RANGEABILITY OF CONNECTING NETworks) 421-34

Group-Theoretic Proof of the Rearrange-ability Theorem for Clos' Network (Toward a) 797–805

GROUP THEORY (APPLICATIONS TO CON-NECTING NETWORKS) 407-20, 421-34

Guess, H. A. 1755-93

Haggerty, J. P. S89-99 Hahn, J. R., Jr. S63-72 Halfin, S. 1733-54 HAMILTON EQUATIONS OF RAY OPTICS 1179-205 HARDWARE (SAFEGUARD DATA-PROC-ESSING SYSTEM) S41-85 Haskell, B. G. 1155-74, 1475-95 Hayes, J. F. 569-93 HEAVY TRAFFIC DIFFUSION MODEL AP-PROXIMATION (GI/G/1)QUEUE) 1637-46 Herrmann, O. 531-44 Heyman, D. P. 1637-46 Hogg, D. C. 165-76 Holden, W. S. 285-96 Hoover, E. S. S181-9 HUB OFFICES (DIGITAL DATA SYSTEM) 943-64

Illium, H. C. 943-64 IMBALANCE (LONGITUDINAL, EFFECT ON Crosstalk) 1227-51 IMPACT AVALANCHE AND TRANSIT TIME

See IMPATT

IMPATT Amplifier (1-Watt, 6-Giga-Hertz Short-Haul Radio Applica-TIONS OF) 721-33

IMPLEMENTATION OF DIGITAL PHASE

SHIFTERS 1497-502
INCOHERENT SOURCES (EXCITATION OF PARABOLIC-INDEX FIBERS) 1507-30 INFINITE EQUALIZER (OPTIMUM TIMING Phase) 189-201

INFINITE LIMITS AND OSCILLATING INTE-GRANDS (NUMERICAL EVALUATION OF Integrals with) 155-64

INFINITE TRUNK GROUPS (BLOCKING) 625-61

Influences of Glass-to-Metal Sealing on the Structure and Magnetic Properties of an Fe/Co/V Alloy 997-1009

INJECTION LASERS (EFFECT OF JUNCTION CAPACITANCE ON TURN-ON DELAY) 53 - 68

INPUT AND OUTPUT IMPEDANCE (MULTI-LOOP FEEDBACK) 1253-75

IN-SERVICE MONITORING OF DATA MULTI-PLEXERS (DIGITAL DATA SYSTEM)

IN-SERVICE PERFORMANCE MONITORING

(DIGITAL DATA SYSTEM) 845-60 INTEGRALS WITH INFINITE LIMITS AND OSCILLATING INTEGRANDS (NUMERI-CAL EVALUATION) 155-64

INTERCITY NETWORK (DIGITAL DATA SYSтем) 861-78

INTERFERENCE

(Rain-Scatter, Terrestrial Microwave Systems) 177-87 (Unbounded Intersymbol, Upper Bound

on Error Probability for Detection with) 1341-51

INTERFRAME CODER (Low-Bit-Rate, VIDEOTELEPHONE) 1475-95

INTERSYMBOL INTERFERENCE (UN-BOUNDED, UPPER BOUND ON ERROR PROBABILITY FOR DETECTION WITH) 1341 - 51

INTRODUCTION AND OVERVIEW (SAFE-GUARD DATA-PROCESSING SYSTEM)

Ishizaka, K. 485-506 ISOLATED UTTERANCES (ALGORITHM FOR DETERMINING ENDPOINTS) 297-315

JACKET DESIGN IMPROVEMENTS FOR GLASS FIBERS 245-62 Jackson, H. M. II S223-9 S181-9 Jacoby, R. A. Jagerman, D. L. 625-61 Jayant, N. S. 1557-81, 1583-95 JERUSALEM-CROSS GRID 263-83, 1725-31 JUNCTION CAPACITANCE (EFFECT ON RISE TIME OF LEDS AND ON TURN-ON Delay of Injection Lasers) 53-68

Knapp, N., Jr. 811-32 Kneuer, J. G. 919-42 KRONECKER PRODUCT APPROACH (TIME-DEPENDENT COUPLED-POWER EQUA-TIONS) 47-52 Kuoni, J. P. S191-6

Labuda, E. E. 687-719 LASERS (EFFECT OF JUNCTION CAPACI-TANCE ON TURN-ON DELAY) 52-68

LAUNCHER (OFFSET, FAR-FIELD STUDIES) MAGNETIC PROPERTIES AND STRUCTURE OF 1319-40 AN FE/CO/V ALLOY (INFLUENCES OF Lawless, W. J. 919-42 GLASS-TO-METAL SEALING) 997-LED EXCITATION OF PARABOLIC-INDEX 1009 FIBERS 1507-30 Mahoney, J. J., Jr. 833-44 MAINTENANCE AND DIAGNOSTIC PROGRAM-LED JUNCTION CAPACITANCE 53-68 Lee, T. P. 53–68 Legg, W. E. 1665–80 FAULT DICTIONARY (SAFEGUARD DATA-PROCESSING SYSTEM) LIGHT-EMITTING DIODE See LED MAINTENANCE AND DIAGNOSTIC SUBSYS-TEM (SAFEGUARD DATA-PROCESS-Lin, S. H. 1051-86 LINE-OF SIGHT MICROWAVE LINKS 103-ING SUBSYSTEM) S63-72 42 PHILOSOPHY (DIGITAL MAINTENANCE Line-of-Sight Paths Over Random Terrain DATA SYSTEM) 845-60 MAJOR MULTILOOP FEEDBACK TECHNIQUES USED IN WIDEBAND AMPLI-735 - 65LINEAR-PHASE FIR DIGITAL FILTERS 531-44 FIER DESIGN 1253-75 LINEAR PREDICTION VOCODER 1693-723 MAN-MACHINE COMMUNICATION LINEAR-PREDICTIVE CODING OF VIDEO-Management Overview (SAFEGUARD TELEPHONE SIGNALS (NONADAPTIVE DATA-PROCESSING SYSTEM) S223-9 AND ADAPTIVE, FRAME-TO-FRAME; MANHATTAN GRAPHS 1647-61 Mansell, J. J. 833–44 Marcuse, D. 3–15, 985–95, 1507–30 Entropy Measurements) 1155-74 MEASUREMENTS (VARIANCE IN MARKOVIAN SERVICE SYSTEMS (VARIANCE MARKOVIAN SERVICE Systems) OF LOAD MEASUREMENTS) 1277-300 1277-300 LOCAL DISTRIBUTION NETWORK (DIGITAL Marr, G. 69-79 MASTER-SLAVE TREE (DIGITAL DATA DATA SYSTEM) 861-78 LOCAL DISTRIBUTION SYSTEM (DIGITAL System Synchronization Network) DATA SYSTEM) 919-42 Material Structure of Germanium-Doped LOCAL OFFICES (DIGITAL DATA SYSTEM) Optical Fibers and Preforms 943 - 64LOGNORMAL DISTRIBUTION MATHEMATICAL STUDY OF AN ADAPTIVE QUANTIZER (NEW RESULTS) 335-68 Rain Attenuation 1051-86 Rain Rate 1051-86 Long-Distance Telephone Matlack, R. C. 833-44 CONNEC-MAXIMUM-LIKELIHOOD RECEPTION TIONS (ECHOES) 209-43 DIGITAL DATA TRANSMITTED OVER LONG-HAUL NETWORK DESIGN (DIGITAL THE FIBER-OPTIC CHANNEL 1389-DATA SYSTEM) 861-78 430 LONGITUDINAL CIRCUITS (CROSSTALK Maximum-Likelihood Sequence Esti-Loss) 1227-51 MATION (BIT ERROR PROBABILITY) LONGITUDINAL IMBALANCE (EFFECT ON Mazo, J. E. 189–201, 1087–94, 1451–62 McDonald, J. F. S111–22 McDonald, P. H. 507–29 CROSSTALK) 1227-51 Loose Tube Splices for Optical Fibers 1215 - 25McKenna, J. 667-85 McNees, G. K. 209-43 Loss (Microbending, Optical Fibers) Loss Calculations in Beam Waveguide MEAN-SQUARE ALGORITHM FOR ADAPTIVE SYSTEMS WITH IMPERFECT LENSES EQUALIZERS WITH PARTIAL RESPONSE SIGNALING (NEW, FAST-CONVERGING) 783-95 LOSSY COATINGS (EFFECT ON TRANSMIS-Means, D. R. 1301-18 SION ENERGY IN A MULTIMODE OPTI-CAL FIBER) 1531-46 MEASUREMENT ERRORS ON RAIN DEPO-Low-Bit-Rate Interframe Coder for Video-LARIZATION EXPERIMENTS (EFFECTS) telephone (A) 1475-95 LOW-LOSS SPLICES FOR OPTICAL FIBERS Meseke, D. W. S29-37

1215 - 25

LOW-LOSS TAPE SPLICES (PREPARATION

OF OPTICAL-FIBER ENDS) 471-7

MacChesney, J. B. 1681-92 MacWilliams, W. H. S237-44

Lueft, W. B. 943-64

Method for Calculating Rain Attenuation Distributions on Microwave Paths (A) Microbending Loss in Optical Fibers 457-

METAL OXIDE SEMICONDUCTOR See MOS

METALLIC CIRCUITS (CROSSTALK LOSS)

Message Trunk Failure 1127-53

Messerli, E. J. 1127-53

435 - 50

1227 - 51

ix

MICROWAVE PATHS (RAIN ATTENUATION CALCULATIONS) 1051-86 CALCULATIONS)

MICROWAVE SYSTEMS (TERRESTRIAL, Rain-Scatter Interference) 177-

MICROWAVES (QUASI-OPTICAL POLARIZA-TION DIPLEXING) 1665-80

Miller, C. M. 1215–25, 1547–55 Miller, G. 1227–51 Mitra, D. 335–68

Mobile Radio Telephony 1583-95 (Step-Size Transm Coders) 1557-81 Transmitting Differential

MOBILE TELEPHONY 1597-614, 1615-36 Mode Coupling in an Optical Fiber With Core Distortions 3-15

MODULATION (ADAPTIVE DELTA, SINGLE-INTEGRATION) 1463-74

Molded-Plastic Technique for Connecting and Splicing Optical-Fiber Tapes and Cables (A) 971-84 Morris, J. E. 721-33

MOS STRUCTURE (DOUBLE-INSULATOR. ALUMINUM OXIDE/SILICON DIOXIDE) 687-719

MOVING IMAGES (TRANSMISSION BY VIDEO-TELEPHONE) 1475-95

Mowery, G. L. 69–79 Mueller, K. H. 143–53, 369–406

MULTIBEAM SATELLITE ANTENNA FOR 20-AND 30-GHz BANDS 1011-26

Multibeam, Spherical-Reflector Satellite Antenna for the 20- and 30-GHz Bands (A) 1011-26

MULTILAYER DIELECTRICS (POLARIZA-TION-INDEPENDENT, OBLIQUE INCI-DENCE) 1027-49

MULTILAYERED MEDIUM (FRUSTRATED TOTAL REFLECTION OF WAVES) 17-

MULTILOOP FEEDBACK TECHNIQUES (MAJOR, USED IN WIDEBAND AMPLI-FIER DESIGN) 1253-75

MULTIMODE FIBERS (MOLDED-PLASTIC TECHNIQUE FOR CONNECTING AND Splicing) 971-84

MULTIMODE OPTICAL FIBERS (Effect of Lossy Coatings on Transmis-

sion Energy) 1531-46 (Low-Loss Splices) 451–5 (Pulse Broadening) 1179–205

(Quasi-Ray Analysis of Crosstalk Be-17-45 tween)

MULTIMODE PULSE DISPERSION MULTIMODE PULSE DISTORTION 3-15 MULTIPATH FADING 103-42

MULTIPATH PROPAGATION 103-42 MULTIPLE SPLICES (PERMANENT, FUSED-

SILICA FIBERS) 451-5 MULTIPLEXING HIERARCHY (DIGITAL DATA SYSTEM) 893-918

MULTIPOINT DIGITAL DATA SYSTEM SERVICE 833-44

Multiprocessor System Debugging (Real-Time, SAFEGUARD Data-Processing System) S133-45

MULTIQUEUE, MULTISERVER SYSTEM WITH FINITE WAITING SPACE IN EACH AND OPTIMAL QUEUE (ANALYSIS Design) 595-623

MULTISERVER, MULTIQUEUE SYSTEM WITH FINITE WAITING SPACE IN EACH QUEUE (ANALYSIS AND OPTIMAL

DESIGN) 595-623 Murphy, E. J. 17-45, 1531-46 Musa, J. D. S245-59

Nåsell, I. 209-43

NETWORK HIERARCHY (DIGITAL DATA System) 861-78

NETWORK PLANNING (DIGITAL DATA SYSтем) 861-78

NETWORK SYNCHRONIZATION **DATA SYSTEM)** 879-92 NETWORKS

(Connecting, Applications of Group Theory) 407-20

(Connecting, Proving Rearrangeability by Group Calculations) 421-34 NEUTRONS (ÉFFECTS ON OPTICAL FIBERS)

1207 - 13New, Fast-Converging Mean-Square Algorithm for Adaptive Equalizers With Partial-Response Signaling (A) 143-

New Results From a Mathematical Study of an Adaptive Quantizer 335-68 Niehols, B. C. S211-9

Noll, P. 1597-614, 1615-36 NONADAPTIVE AND ADAPTIVE, FRAME-TO-FRAME, LINEAR-PREDICTIVE CODING OF VIDEOTELEPHONE SIGNALS (EN-TROPY MEASUREMENTS) 1155-74 Nonstationary Blocking in Telephone Traffic

Novel Implementation of Digital Phase Shifters (A) 1497-502

NUCLEAR RADIATION (ENVIRONMENTAL, EFFECTS ON OPTICAL FIBERS) 1207-13

NUMBER 5 CROSSBAR (Dial-Tone Delay Problem) 1733-54 (Effect of Frame Load and Balance on

Dial-Tone Delay) 1755–93 Numerical Evaluation of Integrals with Infinite Limits and Oscillating Integrands 155 - 64

NYQUIST SIGNALING (FASTER-THAN) 1451 - 62

OBLIQUE INCIDENCE (POLARIZATION-INDE-PENDENT, MULTILAYER DIELECTRICS) 1027 - 49 O'Connor, P. B. 1681-92 Office Channel Unit (Digital Data System) 919-42

Offset Launcher (Some Far-Field Studies) 1319-40

Offset Paraboloidal Reflector (Far-Field Properties) 1319-40

Olson, J. W. S41-61 I-Watt, 6-Gigahertz IMPATT Amplifier for Short-Haul Radio Applications (A) 721-33

OPTICAL CABLE SPLICING 1547-55 OPTICAL FIBER (MULTIMODE, EFFECT OF LOSSY COATINGS ON TRANSMISSION ENERGY) 1531-46

OPTICAL FIBER COMMUNICATION SYSTEM (Optimum Direct Detection of Digital Data Signals) 1389–430 OPTICAL-FIBER ENDS (PREPARATION FOR

Low-Loss Tape Splices) 471-7
Optical Fiber Packaging and Its Influence
on Fiber Straightness and Loss 245-

OPTICAL-FIBER TAPES (ALL-GLASS) 479-84

OPTICAL-FIBER TAPES AND CABLES (MOLDED-PLASTIC TECHNIQUE FOR CONNECTING AND SPLICING) 971-84
OPTICAL FIBER TRANSVERSE COUPLING

(Crosstalk) 1431-50 Optical Fiber with Core Distortions

(Mode Coupling) 3-15 Optical Fibers

(Effects of Environmental Nuclear Radiation) 1207-13 (Loose Tube Splices) 1215-25 (Minchedia Loose 125 457 65

(Microbending Loss) 457–65 (Multimode, Low-Loss Splices) 451–5 (Multimode, Pulse Broadening) 1179– 205

(Multimode, Quasi-Ray Analysis of Crosstalk Between) 17-45 Optical Fibers and Preforms (Ger-

OPTICAL FIBERS AND PREFORMS (GER-MANIUM-DOPED, MATERIAL STRUC-TURE) 1681-92

OPTICAL-FREQUENCY COMMUNICATION SYSTEMS 285-96 Optical-Frequency Pulse-Position-Modula-

tion Experiment (An) 285-96
OPTICAL WAVEGUIDES (ANISOTROPIC,
COUPLED-MODE THEORY) 985-95
OPTICS (FIRER TRANSVERSE COUPLING—

Optics (Fiber, Transverse Coupling— Crosstalk) 1431-50 Optimal Rearrangeable Graphs 1647-61

OPTIMUM DETECTORS FOR FASTER-THAN-NYQUIST TRANSMISSION 1451-62 Optimum Direct Detection for Digital Fiber-Optic Communication Systems 1389-

430
Optimum Timing Phase for an Infinite

Equalizer 189–201
OSCILLATING INTEGRANDS AND INFINITE
LIMITS (NUMERICAL EVALUATION OF
INTEGRALS WITH) 155–64

Overview (Digital Data System) 811-32

P

Parabolic-Index Fibers with Incoherent Sources (Excitation) 1507–30 Parallel Scramblers 569–93

Partial-Response Signaling 143-53 Passband Transmission (Equalizer Timing) 189-201

p-Channel, Bipolar-IGFET, Depletion-Load Technology 69-79

PCM Systems 1597-614 Pelow, F. A. 263-83

Performance Objectives (Digital Data System) 833-44

Permanent Multiple Splices of Fused-Silica Fibers 451-5 Personick, S. D. 47-52 Perturbation Theory (Time-Depen-

Perturbation Theory (Time-Dependent Coupled-Power Equations)
47-52

Petersen, J. E. S237-44
Phase Errors (Small, Effect Upon
Transmission Between Confocal
Apertures) 783-95

Phase Shifters (Digital, Implementation) 1497-502

TION) 1497–502 Phillips, A. K. S133–45 Phipps, G. W. 861–78

PHOTODETECTION OF DIGITAL DATA SIGNALS 1389-430

Physical Design (Digital Data System) 943-64 Picture Quality (Videotelephone) 1475-95

Pinnel, M. R. 997-1009 PL/1 (System Programming, SAFE-GUARD Data-Processing System) S173-80

Plastic Jacket Design for Glass Fibers 245-62

POINT-TO-POINT DIGITAL DATA SYSTEM SERVICE 833-14

Point-to-Point Digital Transmission 811–32 Polarization Diplexing of Micro-

POLARIZATION DIPLEXING OF MICRO-WAVES (QUASI-OPTICAL) 1665-80 Polarization-Independent, Multilayer Dielectrics at Oblique Incidence 1027-49

Power Spectrum of a Digital, Frequency-Modulation Signal 1095-125

PPM See Pulse-Position-Modulation Prabhu, V. K. 1095-125 Precession Limitations in Phase-

MODULATED SYSTEMS 569-93
PREFORMS AND OPTICAL FIBERS (GERMANIUM-DOPED, MATERIAL STRUC-

Ture) 1681-92 Preparation of Optical-Fiber Ends for Low-Loss Tape Splices 471-7 Presby, H. M. 3-15, 1681-92

Process Design in the Structure of

REAL-TIME SOFTWARE SYSTEMS (SAFEGUARD DATA-PROCESSING SYSTEM) S101-9

PROCESS SYSTEM TESTING AND SYSTEM EXERCISER (SAFEGUARD DATA-PROCESSING SYSTEM) S111-22

PROGRAM-FAULT DICTIONARY (SAFE-GUARD DATA-PROCESSING SYSTEM) S73-85

PROGRAM PRODUCTION LIBRARIANS (SAFEGUARD DATA-PROCESSING SYSTEM) S211-9

PROGRAMMING (STRUCTURED, AND PRO-GRAM PRODUCTION LIBRARIANS; SAFEGUARD DATA-PROCESSING SYSTEM) S211-9

PROJECT CONTROL (SAFEGUARD DATA-PROCESSING SYSTEM) S223-59 PROPAGATION OF 60-GHz WAVES THROUGH

Propagation of 60-GHz Waves Through Rain (Experiment) 165-76 Protection Switching (Digital Data

System) 845-60
Proving the Rearrangeability of Connecting

Networks by Group Calculations 421– 34 Pulse Broadening in Multimode Optical

Pulse Broadening in Multimode Optical Fibers 1179-205

Pulse Code Modulation See PCM
Pulse-Position-Modulation Experiment (Optical-Frequency) 285-96
Pulse Shortening Due to Mode Cou-

O

PLING 3-15

QUANTIZATION SCHEMES FOR SPEECH EN-CODING (COMPARATIVE STUDY) 1597-614

QUANTIZER (ADAPTIVE, NEW RESULTS FROM A MATHEMATICAL STUDY) 335-68

QUANTIZER PERFORMANCE (BOUNDED AND UNBOUNDED RANGE) 335-68

QUASI-OPTICAL DIPLEXERS (RESONANT-GRID) 263-83 Quasi-Optical Polarization Diplexing of

Microwaves 1665–80 Quasi-Ray Analysis of Crosstalk Between Multimode Optical Fibers 17–45

QUEUE WITH FINITE WAITING SPACE (MULTISERVER, MULTIQUEUE SYSTEM ANALYSIS AND OPTIMAL DESIGN) 595-623

QUEUES (CYCLIC-TYPE, APPROXIMATE METHOD FOR CALCULATING DELAYS)
1733-54

QUEUING SYSTEM
Design 595-623
(Single-Server, Diffusion Model Approximation) 1637-46

R

Rabiner, L. R. 81-102, 297-315, 531-44, 1497-502

RADIATION (ENVIRONMENTAL NUCLEAR, EFFECTS ON OPTICAL FIBERS) 1207-13

RADIO APPLICATIONS (SHORT-HAUL; 1-WATT, 6-GIGAHERTZ IMPATT AMPLI-FIER) 721-33

RADIO RELAY SYSTEMS (EFFECT OF RAIN ATTENUATION) 1051-86

RAIN (EFFECT ON ATTENUATION AND POLARIZATION OF MILLIMETER WAVES) 165-76

RAIN ATTENUATION 165-76, 177-87
(Distributions of Microwave Paths, Method for Calculating) 1051-86
RAIN DEPOLARIZATION EXPERIMENTS

KAIN DEPOLARIZATION EXPERIMENTS (SOME EFFECTS OF MEASUREMENT ERRORS) 435-50

RAIN GAUGE NETWORK MEASUREMENTS
1051-86

Rain—Scatter Interference in Terrestrial Microwave Systems 177-87 RANDOM TERRAIN (LINE-OF-SIGHT PATHS)

RAY EQUALIZERS USED TO REDUCE PULSE BROADENING 1179-205

RAY OPTICS (HAMILTON EQUATIONS) 1179-205

RC Active Filter Performance 507-29

RC Active Filters for the D3 Channel Bank
507-29

REAL-TIME DATA-PROCESSING SYSTEM DEVELOPMENT (SAFEGUARD) S9-25

REAL-TIME MULTIPROCESSOR SYSTEM DEBUGGING (SAFEGUARD DATA-PROCESSING SYSTEM) S133-45

REAL-TIME SOFTWARE DEVELOPMENT (SAFEGUARD DATA-PROCESSING SYSTEM) S89-145

REAL-TIME SOFTWARE SYSTEM STRUCTURE (PROCESS DESIGN, SAFEGUARD DATA-PROCESSING SYSTEM) S101-9

REARRANGEABILITY OF CONNECTING NET-WORKS BY GROUP CALCULATIONS (PROVING) 421-34

REARRANGEABILITY THEOREM FOR CLOS' NETWORK (TOWARD A GROUP-THEO-RETIC PROOF) 797–805

REARRANGEABLE GRAPHS 1647-61 Rechtenbaugh D. L. 845-60

Rechtenbaugh, D. L. 845-60 REMENDUR (FE/Co/V ALLOY) REED (IN-FLUENCES OF GLASS-TO-METAL SEAL-ING ON STRUCTURE AND MAGNETIC PROPERTIES) 997-1009

PROPERTIES) 997-1009
REMENDUR WIRE (MAGNETIC PROPERTIES) 997-1009

REMREED SEALED CONTACT (CHANGES IN COERCIVITY AND REMANENCE OF MAGNETIC REED DURING GLASS-TO-METAL SEALING) 997-1009

REPAIR (DIGITAL DATA SYSTEM) 845-60 RESISTANCE-CAPACITANCE ACTIVE FIL-TERS See RC ACTIVE FILTERS Resonant-Grid Quasi-Optical Diplexers 263-83

Rice, D. W. 943-64 Rice, S. O. 155-64 Rifenberg, C. J. S9-25, S73-85 Rowe, H. E. 1095-125

SAFEGUARD BALLISTIC MISSILE DE-FENSE SYSTEM S1-261

SAFEGUARD Data-Processing System: Architecture of the Central Logic and Control S41-61

Central Logic and Control Operating System S89-99

CENTRAN-A Case History in Extendible Language Design S161-72 Cost-Plus-Award-Fee Contract for a Large

Software Development Program (A) S237-44

Data-Processing System Performance Requirements in Retrospect (The) S29-

Debugging a Real-Time Multiprocessor System S133-45

(Development Tools and Techniques) S199-219 Dictionary Approach to Digital Mainte-nance (The) S73-85

Experiment in Software Development

(An) S199-210 Foreword S3-5 Glossary S261 Hardware S41-85

Introduction and Overview S9-25 Maintenance and Diagnostic Subsystem

S63-72 Management Overview S223-9 Means to Effective Computer Resource

Utilization (A) S191-6 Preface S1

Process Design in the Structure of Real-Time Software Systems S101-9 Process-System Testing and the System

Exerciser S111-22 Project Control S223-59

Real-Time Software Development S89-

SAFEGUARD Data Reduction System S181-9

Software Change Control S231-6 Software Project Management S245-59 Structured Programming and Program

Production Librarians S211-9 Support Software and Support Computers: An Overview S149-60

Support Systems S149-96 System Error Control S123-31 Systems Engineering S29-37

Systems Programming in PL/1

SAFEGUARD DATA REDUCTION SYSTEM S181-9

Salazar, A. C. 767–81 Saleh, A. A. M. 1027–49 Saltzberg, B. R. 879–92

Saltzberg, B. R. 8 Salz, J. 1389–430 Sambur, M. R. 81-102, 297-315, 1693-

723SATELLITE ANTENNA (MULTIBEAM, SPHER-ICAL-REFLECTOR FOR 20- AND 30-

GHz BANDS) 1011-26 SATELLITE COMMUNICATION SYSTEM FOR 20- AND 30-GHZ BANDS (MULTIBEAM-

ANTENNA) 1011-26 SATELLITE SIGNALS (MEASUREMENTS OF

RAIN-PRODUCED DEPOLARIZATION) 435 - 50

Schafer, R. W. 531 - 44Schmidt, R. L. 1475–95 Schryer, N. L. 667–85

SCRAMBLERS (CASCADED AND PARALLEL)

SCRAMBLERS AND TIMING RECOVERY IN Data Transmission 569-93

SEALING (GLASS-TO-METAL, INFLUENCES ON STRUCTURE AND MAGNETIC PROP-ERTIES OF AN FE/Co/V ALLOY 997-1009

Self-Resonant Grids (Theory) 1725-31

Semplak, R. A. 1319-40 Service Restoration (Digital Data System) 845-60

Shah, J. 1207-13

SHIFTED-COMPANION-FORM ACTIVE FIL-TERS (DESIGN AND EVALUATION)

Shipley, K. L. 485-506 Shively, R. R. 1497-502 SHORT-HAUL RADIO APPLICATIONS

WATT, 6-GIGAHERTZ IMPATT AM-PLIFIER) 721-33

SHORT-HOLDING-TIME TRUNKS (ANALY-SIS OF TRUNK GROUPS CONTAINING) 1127 - 53

SIGNAL-TO-NOISE PERFORMANCE (Adaptive Quantizer) 335–68 Speech-Encoding System (Effects of 1615-36 Channel Errors)

SIGNAL-TO-NOISE RATIO (SINGLE-INTE-GRATION, ADAPTIVE DELTA MODULA-TOR) 1463-74

SIGNALING (FASTER-THAN-NYQUIST) 1451-62

SILICON DIOXIDE/ALUMINUM OXIDE Double-Insulator, MOS STRUC-TURE 687-719

Single-Integration, Adaptive Delta Modu-lation 1463-74

SINGLE-SERVER QUEUE (HEAVY TRAFFIC DIFFUSION MODEL APPROXIMATION)

6-GIGAHERTZ, 1-WATT IMPATT AMPLI-FIER FOR SHORT-HAUL RADIO APPLI-**CATIONS** 721-33

REARRANGEABILITY SLEPIAN-DUGUID THEOREM 407-20, 421-34 (Proved for Clos' Three-Stage Network)

797-805

Slojkowski, F. E. S63-72 SMALL-PHASE-ERROR UPON EFFECT TRANSMISSION BETWEEN CONFOCAL

APERTURES 783-95 Smith, P. W. 471-7, 479-84, 971-84 Snow, N. E. 811-32

SOFTWARE AND COMPUTERS (SUPPORT, SAFEGUARD DATA-PROCESSING System) S149-60 Software Change Control (SAFE-

GUARD DATA-PROCESSING SYSTEM) S231-6

SOFTWARE DEVELOPMENT EXPERIMENT (SAFEGUARD DATA-PROCESSING System) S199-210

DEVELOPMENT SOFTWARE PROGRAM (Cost-Plus-Award-Fee Contract, DATA-PROCESSING SAFEGUARD System) S237-44

SOFTWARE PROJECT MANAGEMENT (SAFE-GUARD DATA-PROCESSING SYSTEM) S245-59

Some Far-Field Studies of an Offset Launcher 1319 - 40SPACE-CHARGE FORMATION IN INSULATORS

687-719

Space-Diversity Engineering 103-42

Spaulding, D. A. 369-406 Speaker-Independent Digit-Recognition Sys-

tem(A) 81-102Specially Doped Varactors for Direct Frequency Tripling (Analysis) 317 - 34

SPECTRAL DENSITY (DIGITAL, FREQUENCY-Modulation Signal) 1095-125

SPEECH ANALYSIS (FIR DIGITAL FILTER Banks) 531-44

Speech Compression Systems 1693-723 Speech-Encoding Quantization 1597-614

SPEECH-ENCODING SYSTEMS (EFFECTS OF CHANNEL ERRORS ON SIGNAL-TO-Noise Performance) 1615-36

SPEECH ENDPOINT ALGORITHM 297-315 SPEECH RECEPTION OVER BURST-ERROR CHANNELS (TIME-DIVERSITY, AUTO-

CORRELATION CRITERION) 1583-95
SPEECH RECOGNITION BY COMPUTERS 81 - 102

Speech Synthesis 1693-723 From a Dynamic Model of Vocal Cords and Vocal Tract 485-506

SPHERICAL-REFLECTOR, MULTIBEAM SAT-ELLITE ANTENNA FOR 20- AND 30-GHZ Bands 1011-26

Spindel, L. A. 861-78

(Loose Tube for Optical Fibers) 1215-25

(Low-Loss Tape, Preparation of Optical-Fiber Ends) 471-7

Multiple, (Permanent Fused-Silica Fibers) 451-5

Splicing (Fiber-Optic-Cable) 1547-55 SPLICING AND CONNECTING OPTICAL-FIBER TAPES AND CABLES (MOLDED-PLASTIC TECHNIQUE) 971-84

SQUARE SWITCHES IN CONNECTING NET-WORKS 407-20, 421-34

Standley, R. D. 1681-92

STATION APPARATUS (DIGITAL DATA SYSтем) 943-64

STATION-TO-STATION DIGITAL TRANSMIS-SION 811-32 STEP SIZE (ADAPTIVE QUANTIZER) 335-

Step-Size Transmitting Differential Coders for Mobile Telephony 1557-81

STRUCTURE AND MAGNETIC PROPERTIES OF FE/Co/V ALLOY (INFLUENCES OF GLASS-TO-METAL SEALING) 997 -1009

STRUCTURE OF OPTICAL FIBERS AND PRE-FORMS 1681-92

STRUCTURE OF REAL-TIME SOFTWARE SYS-TEMS (Process Design, SAFE-GUARD DATA-PROCESSING SYSTEM) 8101-9

STRUCTURED PROGRAMMING AND PROGRAM PRODUCTION LIBRARIANS (SAFE-GUARD DATA-PROCESSING SYSTEM) S211-9

SUPPORT SOFTWARE AND SUPPORT COM-PUTERS (SAFEGUARD DATA-PROC-ESSING SYSTEM) S149-60

SUPPORT SYSTEMS (SAFEGUARD DATA-PROCESSING SYSTEM) S149-96 SWITCH-COUNT LOAD VARIANCE 1277-

300 SWITCH PERMUTATIONS IN CONNECTING Networks 421-34

SWITCHED-TELEPHONE NETWORK ECHO Performance 209-43 SWITCHING NETWORK (GRAPH REPRESEN-

TATIONS) 1647-61 SYNCHRONIZATION NETWORK (DIGITAL

Data System) 879-92 Synchronous DATA COMMUNICATION

(CYCLIC EQUALIZATION) 369-406 Synthesis of Speech From a Dynamic Model of the Vocal Cords and Vocal Tract

485 - 506SYNTHETIC SPEECH PRODUCTION 1693-723

SYSTEM ERROR CONTROL (SAFEGUARD) Data-Processing System) S123-31 (SAFEGUARD) SYSTEM EXERCISER

S111-22 Systems Engineering (SAFEGUARD Data-Processing System) S29-37

Systems Programming in PL/1 (SAFE-GUARD DATA-PROCESSING SYSTEM) S173-80 TAPES (ALL-GLASS OPTICAL-FIBER) 479-

CABLES (OPTICAL TECHNIQUE TAPES (OPTICAL-FIBER, AND MOLDED-PLASTIC CONNECTING AND SPLICING) 971-84 TECHNOLOGIES USED IN DIGITAL DATA

SYSTEM 943-64

TELECOMMUNICATIONS SYSTEM INCORPO-RATING DIGITAL DATA SYSTEM 811-

TELEPHONE CONNECTIONS IN THE UNITED STATES (TOLL, ECHO PERFORMANCE)

TELEPHONE DIRECTORY ASSISTANCE SER-VICE (QUEUING MODEL) 595-623

TELEPHONE SET TRANSMISSION CHARAC-TERISTICS (COMPUTER-AIDED ANALYSIS USING T1 CARBON TRANSMITTER MODEL) 1301-18 TELEPHONE TRAFFIC

(NONSTATIONARY BLOCKING) 625-61

TELETRAFFIC MODELS (LOAD MEASURE-MENT) 1277-300

TERRAIN PROPERTIES RELATED TO LINE-OF-SIGHT PATHS 735-65 TESTING AND MAINTENANCE (DIGITAL

Data System) 845-60 Thatcher, T. W., Jr. 209-43 Theory of Self-Resonant Grids (On the)

1725 - 31

THREE-BIT ENCODING 1597-614 THRESHOLD SWITCHING 103-42

TIME-DEPENDENT COUPLED-POWER EQUA-TIONS (Two Derivations) 47-52

TIME-DIVERSITY SPEECH RECEPTION OVER BURST-ERROR CHANNELS (AUTOCOR-RELATION CRITERION) 1583-95

TIMING PHASE (OPTIMUM FOR AN INFINITE EQUALIZER) 189-201

Timing Recovery and Scramblers in Data Transmission 569-93

TIMING SUPPLY DESCRIPTION (DIGITAL DATA SYSTEM) 879-92

TIMING SYNCHRONIZATION (PULSE-POSI-TION-MODULATION SYSTEM) 285-96

TOLL TELEPHONE CONNECTIONS IN THE United States (Echo Performance)

T1 Carbon Transmitter Model for Use in Computer-Aided Analysis of Telephone Set Transmission Characteristics 1301-18

Tow, J. 545-68 Traffic Measurements (Telephone Service) 1277-300

(FIELD-AIDED. TRANSFER CHARGE-COUPLED DEVICE TRANSFER ANALYsis) 667-85

TRANSMISSION BETWEEN CONFOCAL APER-TURES (EFFECT OF SMALL PHASE ERRORS) 783-95

TRANSMISSION CHARACTERISTICS (TELE-PHONE SET, COMPUTER-AIDED ANALYSIS USING T1 CARBON TRANSMITTER Model) 1301-18

Transmission Loss

Due to Lossy Coatings (Multimode Optical Fibers) 1531–46 In a Confocal System 783-95

Transverse Coupling in Fiber Optics-Part IV: Crosstalk 1431-50

TRAPEZOIDAL RULE (USED TO EVALUATE INTEGRALS) 155-64

TRIPLING (DIRECT FREQUENCY, SPECIALLY DOPED VARACTORS FOR) 317-34 TROUBLE ISOLATION (DIGITAL DATA SYS-

тем) 845-60 TRUNK GROUPS CONTAINING SHORT-HOLD-

ING-TIME TRUNKS (ANALYSIS) TRUNKS (SHORT-HOLDING-TIME, CON-

Turrin, R. H. 1011-26

Two Derivations of the Time-Dependent Coupled-Power Equations 47-52 Two Design Techniques for Digital Phase

Networks 767-81 TWO-STAGE DATA MULTIPLEXERS (DIGI-TAL DATA SYSTEM) 893-918

UNBOUNDED INTERSYMBOL INTERFERENCE (UPPER BOUND ON ERROR PROBA-BILITY FOR DETECTION WITH) 1341-

UNIVERSAL CROSS-CONNECT-DS-0 SIG-NAL FORMAT (DIGITAL DATA SYSTEM)

UPPER BOUND (FORNEY'S, BIT ERROR PROBABILITY FOR MAXIMUM-LIKELI-HOOD SEQUENCE ESTIMATION) 1087-

Upper Bound on Error Probability for Detection With Unbounded Intersymbol Interference 1341-51

USER'S VIEW OF THE NETWORK (DIGITAL Data System) 833-44

Van Haften, D. S231-6 Van Sciver, P. A. S173-80

VARACTOR DIODE TECHNOLOGY 317-34 VARACTORS (SPECIALLY DOPED FOR DI-RECT FREQUENCY TRIPLING) 317-34

Variance of Load Measurements in Markovian Service Systems 1277-300 VHF RADIO PROPAGATION 735-65

VIDEOTELEPHONE (LOW-BIT-RATE INTER-FRAME CODER) 1475-95

VIDEOTELEPHONE SIGNALS (NONADAPTIVE AND ADAPTIVE, FRAME-TO-FRAME, LINEAR-PREDICTIVE CODING; EN-TROPY MEASUREMENTS) 1155-74

Vigants, A. 103-42 Vocal Cords and Vocal Tract (Human, COMPUTER MODEL) 485-506 VOCODER (EFFICIENT LINEAR PREDICTION) 1693-723 VOICE-FREQUENCY ACTIVE FILTERS (D3 CHANNEL BANK) 507-29

WAITING SPACE IN QUEUE (FINITE-MULTISERVER, MULTIQUEUE SYSTEM ANALYSIS AND OPTIMAL DESIGN) 595 - 623WAVE PROPAGATION THROUGH RAIN 165-76 WAVEGUIDES (ANISOTROPIC OPTICAL, COUPLED-MODE THEORY) 985-95
Whitaker, B. A. 595-623
Wideband Amplifier Design Using Major Multiloop Feedback Techniques 1253-75

WINDOWING DESIGN METHOD (FIR DIGITAL FILTERS) 531-44
Wire-Tap Channel (The) 1355-87
Woomer, F. N., Jr. S245-59 WORD-RECOGNITION ALGORITHMS 81-102

Wyner, A. D. 1341-51, 1355-87

Zydney, H. M. 879-92

1975 CONTENTS

January

	Bell Laboratories Fiftieth Anniversary	1
D. Marcuse and H. M. Presby	Mode Coupling in an Optical Fiber With Core Distortions	3
A. H. Cherin and E. J. Murphy	Quasi-Ray Analysis of Crosstalk Between Multimode Optical Fibers	17
S. D. Personick	Two Derivations of the Time-Dependent Coupled-Power Equations	47
T. P. Lee	Effect of Junction Capacitance on the Rise Time of LED's and on the Turn-on Delay of Injection Lasers	53
G. Marr and G. L. Mowery	A Depletion-Load, p-Channel, Bipolar- IGFET Technology	69
M. R. Sambur and L. R. Rabiner	A Speaker-Independent Digit-Recognition System	81
A. Vigants	Space-Diversity Engineering	103
K. H. Mueller	A New, Fast-Converging Mean-Square Algorithm for Adaptive Equalizers With Partial-Response Signaling	143
S. O. Rice	Numerical Evaluation of Integrals With Infinite Limits and Oscillating Integrands	155
O. E. DeLange, A. F. Dietrich, and D. C. Hogg	An Experiment on Propagation of 60-GHz Waves Through Rain	165
K. Bullington	Rain-Scatter Interference in Terrestrial Microwave Systems	177
J. E. Mazo	Optimum Timing Phase for an Infinite Equalizer	189
	Contributors to This Issue	203
	February	
F. P. Duffy, G. K. McNees, I. Nåsell, and T. W. Thatcher, Jr.	Echo Performance of Toll Telephone Connections in the United States	209
D. Gloge	Optical-Fiber Packaging and Its Influence on Fiber Straightness and Loss	245
J. A. Arnaud and F. A. Pelow	Resonant-Grid Quasi-Optical Diplexers	263
W. S. Holden	An Optical-Frequency Pulse-Position- Modulation Experiment	285

xvii

L. R. Rabiner and M. R. Sambur	An Algorithm for Determining the Endpoints of Isolated Utterances	297
S. V. Ahamed	Analysis of Specially Doped Varactors for Direct Frequency Tripling	317
D. Mitra	New Results From a Mathematical Study of an Adaptive Quantizer	335
K. H. Mueller and D. A. Spaulding	Cyclic Equalization—A New Rapidly Converging Equalization Technique for Synchronous Data Communication	369
V. E. Beneš	Applications of Group Theory to Connecting Networks	407
V. E. Beneš	Proving the Rearrangeability of Connecting Networks by Group Calculations	421
D. C. Cox	Some Effects of Measurement Errors on Rain Depolarization Experiments	435
F. W. Dabby	Permanent Multiple Splices of Fused-Silica Fibers	451
W. B. Gardner	Microbending Loss in Optical Fibers	457
	Contributors to This Issue	467
	March	
E. L. Chinnock, D. Gloge, P. W. Smith, and D. L. Bisbee	Preparation of Optical-Fiber Ends for Low-Loss Tape Splices	471
D. L. Bisbee and P. W. Smith	All-Glass Optical-Fiber Tapes	479
J. L. Flanagan, K. Ishizaka, and K. L. Shipley	Synthesis of Speech From a Dynamic Model of the Vocal Cords and Vocal Tract	485
R. A. Friedenson, R. V. Daniels, R. Jow, and P. H. McDonald	RC Active Filters for the D3 Channel Bank	507
R. W. Schafer, L. R. Rabiner, and O. Herrmann	FIR Digital Filter Banks for Speech Analysis	531
J. Tow	Design and Evaluation of Shifted-Companion- Form Active Filters	545
R. D. Gitlin and J. F. Hayes	Timing Recovery and Scramblers in Data Transmission	569
B. A. Whitaker	Analysis and Optimal Design of a Multiserver, Multiqueue System With Finite Waiting Space in Each Queue	595

D. L. Jagerman	Nonstationary Blocking in Telephone Traffic	625
	Contributors to This Issue	663
	April	
	•	
J. McKenna and N. L. Schryer	Analysis of Field-Aided, Charge-Coupled Device Transfer	667
J. T. Clemens, E. F. Labuda, and C. N. Berglund	Aluminum Oxide/Silicon Dioxide, Double-Insulator, MOS Structure	687
J. E. Morris and J. W. Gewartowski	A 1-Watt, 6-Gigahertz IMPATT Amplifier for Short-Haul Radio Applications	721
E. N. Gilbert	Line-of-Sight Paths Over Random Terrain	735
F. J. Brophy and A. C. Salazar	Two Design Techniques for Digital Phase Networks	767
. Anderson	The Effect of Small Phase Errors Upon Transmission Between Confocal Apertures	783
V. E. Beneš	Toward a Group-Theoretic Proof of the Rearrangeability Theorem for Clos' Network	797
	Contributors to This Issue	807
	Man home	
	May–June	
	DIGITAL DATA SYSTEM	
N. E. Snow and N. Knapp, Jr.	System Overview	811
J. J. Mahoney, Jr., J. J. Mansell, and R. C. Matlack	User's View of the Network	833
S. M. Fitch and D. L. Rechtenbaugh	Testing and Maintenance	845
P. F. Brown, Jr., G. W. Phipps, and L. A. Spindel	Network Planning	861
B. R. Saltzberg and H. M. Zydney	Network Synchronization	879
P. Benowitz, S. J. Butterfield, M. P. Cichetti, Jr., and T. G. Cross	Digital Multiplexers	893
E. C. Bender, J. G. Kneuer, and W. J. Lawless	Local Distribution System	919

CONTENTS

xix

H. C. Illium, W. B. Lueft, and D. W. Rice	Physical Design	943
	Contributors to This Issue	965
	July-August	
P. W. Smith, D. L. Bisbee, D. Gloge, and E. L. Chinnock	A Molded-Plastic Technique for Connecting and Splicing Optical-Fiber Tapes and Cables	971
D. Marcuse	Coupled-Mode Theory for Anisotropic Optical Waveguides	985
M. R. Pinnel and J. E. Bennett	Influences of Glass-to-Metal Sealing on the Structure and Magnetic Properties of an Fe/Co/V Alloy	997
R. H. Turrin	A Multibeam, Spherical-Reflector Satellite Antenna for the 20- and 30-GHz Bands	1011
A. A. M. Saleh	Polarization-Independent, Multilayer Dielectrics at Oblique Incidence	1027
S. H. Lin	A Method for Calculating Rain Attenuation Distributions on Microwave Paths	1051
J. E. Mazo	A Geometric Derivation of Forney's Upper Bound	1087
H. E. Rowe and V. K. Prabhu	Power Spectrum of a Digital, Frequency-Modulation Signal	1095
L. J. Forys and E. J. Messerli	Analysis of Trunk Groups Containing Short-Holding-Time Trunks	1127
B. G. Haskell	Entropy Measurements for Nonadaptive and Adaptive, Frame-to-Frame, Linear-Predictive Coding of Videotelephone Signals	1155
1	Contributors to This Issue	1175
	September	
J. A. Arnaud	Pulse Broadening in Multimode Optical Fibers	1179
J. Shah	Effects of Environmental Nuclear Radiation on Optical Fibers	1207
C. M. Miller	Loose Tube Splices for Optical Fibers	1215
G. Miller	The Effect of Longitudinal Imbalance on Crosstalk	1227
T. J. Aprille, Jr.	Wideband Amplifier Design Using Major Multiloop Feedback Techniques	1253
A. Descloux	Variance of Load Measurements in Markovian Service Systems	1277

D. R. Means	TI Carbon Transmitter Mode! for Use in Computer-Aided Analysis of Telephone Set Transmission Characteristics	1301
M. J. Gans and R. A. Semplak	Some Far-Field Studies of an Offset Launcher	1319
A. D. Wyner	Upper Bound on Error Probability for Detection With Unbounded Intersymbol Interference	1341
	Contributors to This Issue	1353
	October	
A. D. Wyner	The Wire-Tap Channel	1355
G. J. Foschini, R. D. Gitlin, and J. Salz	Optimum Direct Detection for Digital Fiber-Optic Communication Systems	1389
J. A. Arnaud	Transverse Coupling in Fiber Optics—Part IV: Crosstalk	1431
J. E. Mazo	Faster-Than-Nyquist Signaling	1451
P. Cummiskey	Single-Integration, Adaptive Delta Modulation	1463
B. G. Haskell and R. L. Schmidt	A Low-Bit-Rate Interframe Coder for Videotelephone	1475
R. E. Crochiere, L. R. Rabiner, and R. R. Shively	A Novel Implementation of Digital Phase Shifters	1497
	Contributors to This Issue	1503
	November	
D. Marcuse	Excitation of Parabolic-Index Fibers With Incoherent Sources	1507
A. H. Cherin and E. J. Murphy	An Analysis of the Effect of Lossy Coatings on the Transmission Energy in a Multimode Optical Fiber	1531
C. M. Miller	A Fiber-Optic-Cable Connector	1547
N. S. Jayant	Step-Size Transmitting Differential Coders for Mobile Telephony	1557
N. S. Jayant	An Autocorrelation Criterion for the Time-Diversity Reception of Speech Over Burst-Error Channels	1583
P. Noll	A Comparative Study of Various Quantization	1597
	Schemes for Speech Encoding	

D. P. Heyman	A Diffusion Model Approximation for the GI/G/1 Queue in Heavy Traffic	1637
F. R. K. Chung	Optimal Rearrangeable Graphs	1647
	Contributors to This Issue	1663
	December	
T. S. Chu, M. J. Gans, and W. E. Legg	Quasi-Optical Polarization Diplexing of Microwaves	1665
H. M. Presby, R. D. Standley, J. B. MacChesney, and P. B. O'Connor	Material Structure of Germanium-Doped Optical Fibers and Preforms	1681
M. R. Sambur	An Efficient Linear-Prediction Vocoder	1693
I. Anderson	On the Theory of Self-Resonant Grids	1725
S. Halfin	An Approximate Method for Calculating Delays for a Family of Cyclic-Type Queues	1733
H. A. Guess	The Effect of Frame Load and Balance on Dial-Tone Delay in No. 5 Crossbar	1755
	Contributors to This Issue	1795
	SPECIAL SUPPLEMENT	
	SAFEGUARD DATA-PROCESSING SYSTEM	
	Preface	S1
	Foreword	S3
	Introduction and Overview	S7
Section I.	Systems Engineering	S27
Section II.	Hardware	S39
Section III.	Real-Time Software Development	S87
Section IV.	Support Systems	S147
Section V.	Development Tools and Techniques	S197
Section VI.	Project Control	S221
	Glossary	S261
	List of Contributors	5263





